The Thirty-sixth Annual Report

of the

UNIVERSITY OF MARYLAND

Agricultural Experiment Station

College Park, Prince George County, Maryland

1922-1923

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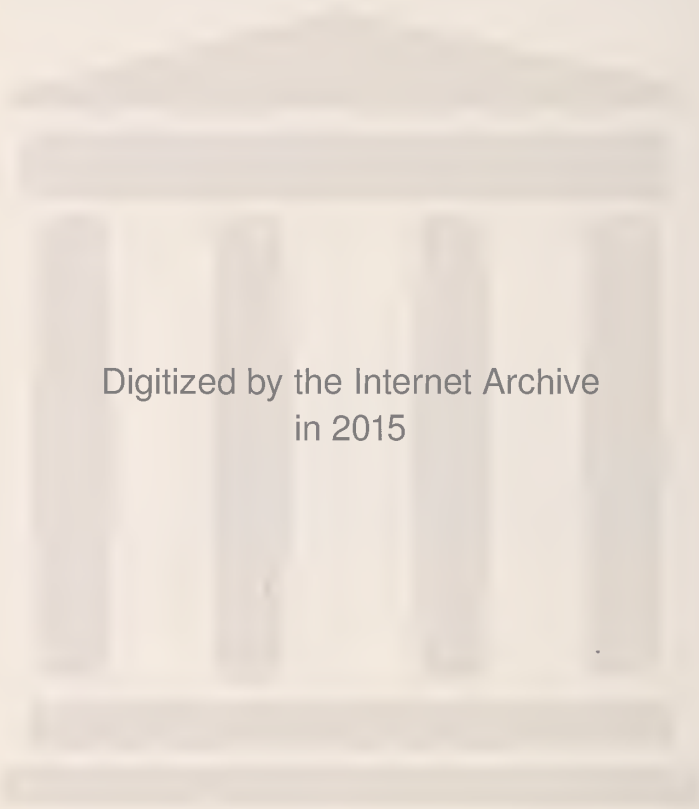

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Agricultural Experiment Station

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The Station is located on the B. & O. R. R. and City and Suburban Electric Car Line, eight miles north of Washington, D. C.

Bell Telephone—Berwyn Exchange.

Visitors will be welcomed at all times, and will be given every opportunity to inspect the work of the Station in all its departments.

The Bulletins and Reports of the Station will be mailed regularly, free of charge, to all residents of the State who request it.

ADDRESS:
AGRICULTURAL EXPERIMENT STATION,
COLLEGE PARK, MD.

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VOLUME 36 - - - - - - - - - - - - - - - - - 1922-23

THE THIRTY-SIXTH ANNUAL REPORT OF THE MARYLAND AGRICULTURAL EXPERIMENT STATION FOR THE FISCAL YEAR ENDING JUNE 30, 1923

By H. J. PATTERSON, *Director*

To the Governor of Maryland and the President and Board of Trustees of the University of Maryland.

GENTLEMEN: In accordance with the requirements of the Act of Congress passed in 1887 providing for the establishment and support of Agricultural Experiment Stations, I submit herewith a report on the progress of the investigational work which is being pursued under the Federal and State appropriations for the fiscal year ending June 30, 1923.

The Station's Contribution to Farming and Science

This report not only completes the work of another fiscal year, but it also marks the completion of 35 years of service of the Station to the State. In using the phrase "Service to the State" we desire to emphasize the fact that, while the work of the Station is designed especially to serve the farming interests, yet the benefits of its results are of value to every citizen and the development of agriculture means the development of the State's greatest natural resource.

The results of the Station's research work since its establishment in 1888 prove beyond a doubt the truth of the statement of the Hon. James Bryce, former British Ambassador to the United States, when he said, "All the money you spend on the Sciences of Agriculture will be returned to you tenfold in the increased prosperity of the county."

In its thirty-five years Maryland has appropriated $467,724 for agricultural investigations. This has amounted to about $9.10 per farm, or 26 cents per farm, per year. During this same period the State appropriation has been supplemented by Federal appropriations amounting to $775,000, or an equivalent of 44 cents per farm per year. This means that there has been an average expenditure of about 70 cents per farm per year in helping the farmer solve his problems and in finding ways to provide food for our

people. In return for this expenditure the results obtained can be conservatively claimed to be annually yielding the following results:

Alfalfa hay worth two million dollars

Increased value of mixed hay crops due to seed mixtures, methods of seeding, fertilization, etc., one million dollars

Soy beans contribute in feed one million dollars

Improvements in wheat by breeding, selection and culture, one and one-half million dollars.

Improvements in corn by breeding, selection and culture, two million dollars

Tobacco (new varieties), seed selection, fertilization and culture, one-half million dollars

Market Garden and Canning Crops—Insect and disease control and seed selection, fertilization, one million dollars

Orchard and Small Fruits—Development of fruit areas, selection of varieties, control of insects and diseases, information on pruning, spraying, thinning, etc., one-half million dollars

Animal Husbandry

The results of investigations in feeding and housing of cows, hogs, horses and poultry have great value which it is impossible to estimate definitely. The same is true of the following investigations which have made outstanding contributions to animal husbandry:

The causes of mottled butter; The significance of Leucocytes in milk; Factors influencing the whipping of cream; The disinfectant properties of washing powders; Dehorning of cattle, Leucoencephalitis in horses; The value of molasses as stock food; Hog cholera; Cow testing associations; Inexpensive aids in producing sanitary milk; Methods for determining the laying hens; Tapeworm of fowls; The relation of earthworms to gapes in chickens; The effect of age on the hatching of eggs; Caponizing; Poultry notes and appliances.

There are numerous other contributions which are proving of much benefit and yielding a good return for their cost. It is still too early to make an estimate or forecast the value which some of the more technical investigations establishing fundamental principles may have.

There has been an almost complete turnover in the personnel managing the farms of the State during the past 35 years and the new generation of farmers are unconsciously profiting by the results of the Experiment Station's investigations.

The increase in yields per acre since the advent of the Experiment Stations as compared to the thirty years before is shown by the figures in the following table, compiled by W. B. Kemp for use in his address before the 1922 session of the Maryland Crop Improvement Association:

TABLE SHOWING YIELD IN BUSHELS PER ACRE, MARYLAND

Year	*Corn*	*Wheat*	*Oats*	*Buckwheat*	*Hay*	*Rye*	*Potatoes*	*Barley*
1866-75*	24.7	10.6	19.9	17.5	1.12	11.9	71.0	20.9
1876-85	26.0	12.8	20.7	15.3	1.10	11.8	71.0	....
1886-95	23.5	13.3	19.9	12.9	1.15	11.1	68.0	22.6
1896-05	32.0	15.9	23.8	17.0	1.18	14.3	74.0	24.7
1906-15	34.9	16.5	28.0	18.3	1.26	15.4	86.0	30.3
1907-16†	35.3	16.5	28.4	18.4	1.29	15.5	86.0	30.4
1908-17	35.8	16.3	28.7	18.5	1.27	15.5	87.0	29.7
1909-18	35.6	16.2	29.5	18.8	1.25	15.5	87.0	29.7
1910-19	36.6	16.1	29.8	19.4	1.27	15.4	88.0	29.8
1911-20	37.0	16.0	30.0	19.6	1.29	15.4	89.0	29.4
1912-21	37.3	15.9	30.0	19.5	1.35	15.3	91.0	30.2
1913-22	37.7	16.1	30.0	19.8	1.36	15.3	89.9	30.7
1914-22‡	38.1	16.3	30.3	20.2	1.37	15.4	90.2	31.0
1915-22	38.2	15.7	30.6	20.3	1.40	15.2	91.7	30.6
1916-22	38.8	15.6	30.2	20.3	1.43	15.0	91.0	30.1
1917-22	38.7	15.6	30.3	20.6	1.42	15.0	90.3	29.8
1918-22	38.7	15.3	30.1	20.5	1.45	14.7	88.4	30.7
1919-22	39.6	15.2	29.4	20.7	1.48	14.7	90.5	30.7
1920-22	39.2	15.8	29.9	19.9	1.50	14.9	89.3	29.9
1921-22	39.5	15.3	28.5	19.8	1.49	14.6	83.0	31.0
1922	40.0	16.5	30.0	20.6	1.62	15.2	101.0	32.0

* Successive 10-year periods
† Overlapping 10-year periods
‡ Averages reducing from 10 to 1

New Information Contributed This Year

The bulletins issued each year represent the completed work for that period and the permanent contributions made to agricultural literature and farm knowledge.

Besides these bulletins, the members of the staff have contributed many technical papers to scientific meetings and journals and numerous popular articles to the agricultural press, and given many practical addresses at farmers' gatherings.

Station Publications

The following bulletins were issued during the fiscal year 1922-23:

1922	*No.*	*Subject*	*Author*	*Pages*
	July.	Thirty-fifth Annual Report	H. J. Patterson.....	16
1923	251	Fertilizer Variety and Seed Selection, Experiments on Irish and Sweet Potatoes.	Thomas H. White.....	7
1923	252	Experiments on the Control of the Woolly Aphis.	Ernest N. Cory.....	13
1923	253	Pasture and Green Manure	J. E. Metzger.....	10
1923	254	Forecasting the Date and Duration of the Best Canning Stage for Sweetcorn	Charles O. Appleman....	10
1923	255	Moisture Relations of Peach Buds During Winter and Spring.....	Earl S. Johnston.....	30

The publications have been mailed out to the farmers on the mailing list.

Investigations in Progress—Soil Department

The soil survey of the State has been completed, but it is necessary to make a revision of some of the earlier surveys in order to make them conform to present soil classifications. The soil survey furnishes the foundation for the soil management studies that are being conducted in the different counties. The following table summarizes the work in progress in the different sections:

EXPERIMENTAL FIELDS

	Name of Field	*County*	*Date*	*Soil Type*	*Remarks—Crops Grown*
1	Ridgely	Caroline	1916	Sassafras—Loam	Corn, Wheat, Grass, Tomatoes
2	Leonardtown	St. Mary's	1916	Leonardtown—Silt Loam	Corn, Wheat, Grass, Tobacco
3	Chestertown	Kent	1917	Sassafras—Silt Loam	Soybeans, Wheat, Grass, Corn
4	Perryman	Harford	1917	Sassafras—Loam	Discontinued, 1921
5	Crownsville	Anne Arundel	1917	Collington—Sandy Loam	Discontinued, 1922
6	Frostburg	Garrett	1917	DeKalb—Gravelly Loam	Discontinued, 1922
7	Doughoregan	Howard	1917	Chester—Loam	Wheat, Grass, Corn, Soybeans
8	Princess Anne	Somerset	1918	Elkton—Silt Loam	Wheat, Grass, Corn, Soybeans
9	La Plata	Charles	1919	Leonardtown—Loam	Wheat, Grass, Corn, Soybeans
10	Sparks	Baltimore	1920	Chester—Loam	Wheat, Grass, Corn, Soybeans
11	Snow Hill	Worcester	1923	Norfolk—Sand	Potatoes and Sweet Potatoes
12	Pocomoke	Worcester	1923	Norfolk—Sandy Loam	Potatoes
13	Back Bay	Baltimore	1923	Sassafras—Loam	Truck Crops
14	Cheltenham	Prince George's	1923	Sassafras—Sand	Being organized
15	Downeyville	Washington	1923	Hagerstown—Loam	Wheat, Grass, Corn, Soybeans

Determinations of the total amount of nitrogen, phosphoric acid and potash contained in all of the important soil types are being made for the purpose of getting an inventory of the soil resources of the State.

The studies as to the value of different sources of lime and the lime requirements of different farmers are being continued. This work has required the examination of samples for more than 1,200 individual farmers.

The pot and laboratory experiments outlined in former reports are being continued.

Agronomy Department

The investigational work of the Agronomy Department falls naturally into two general lines, viz., crop production, and crop improvement.

Crop production deals with such factors as varieties and their adaptation, methods of production, environmental factors influencing yields, effect of the cropping system on production and income, the place for utilizing fertility materials, the quality of the seed, and the time and rate of seeding.

The testing of varieties of farm crops has been in progress since the organization of the Experiment Station. At the present time there is being tested 21 varieties of wheat, 11 varieties of corn for hay and seed, 30 varieties of soybeans and 7 varieties of winter oats. The leading varieties of wheat are: Mammoth Red, the Fulcaster group (Bearded Purple Straw, Deitz Longberry, and Miracle, etc.), Currell's Prolific, China, and Leap's Prolific. In corn the Maryland strains of Johnson County White, Reid's Yellow Dent, Leaming and Thomas have yielded highest. Virginia, Wilson, Peking and Patapsco are the best yielding varieties of soybeans. At least twenty other varieties also are satisfactory. This would indicate that soybeans are especially well adapted to our climate.

It seems from some results obtained in studies made during the last few years that weather and climate are factors under many conditions of far greater consequence in determining yields than soil type. The plots at College Park range from a heavy loam to a sandy loam. Corrections made during any single year indicate a material difference in the yields for these types, but when the climate and weather factors are deducted the soil type difference shrinks to an insignificant figure. The preliminary work necessary for extended investigational work along this line should be completed during the present year.

The experimental work which should be carried out in this connection involves work in both plant physiology and genetics. The outlines for these experiments were presented during the last year.

Considerable work has been done in the past on methods of crop production. This should be supplemented by additional experimental work which would fill up the gaps. For example, the influence on succeeding crops in a rotation where fertilizer is applied to a crop of timothy should be worked out. This will require considerable land.

At present there is maintained six types of cropping systems, but all of them are three-year rotations. This work should be extended so as to give longer rotations and a greater variety of crops. It would require about 40 acres of land to fully conduct the field work.

Several experiments on the time and rate of seeding are in progress, or are ready to be reported upon. The most important of these experiments is that of seeding mixtures for hay. The results on one crop has been obtained, and results of the second seeding will be available in 1924.

Some studies along new lines in the breeding of corn and oats are in progress which promise fruitful results.

Animal Husbandry

The Animal work of the Station is allotted to three different departments, viz.: General Animal Husbandry, which includes horses, beef cattle, sheep, swine, and their products; Dairy Husbandry, dairy cattle and dairy products, and Poultry Husbandry. Since the establishment of the Station there has been issued 254 bulletins, 65 of which have been on Animal Husbandry subjects. Thirty-two of these have related to dairying and 13 to poultry.

Department of General Animal Husbandry

This department is both under-manned and under-equipped to undertake the amount and character of work which its agricultural importance would warrant. The principal projects under investigation at present consists in studies of forage crops for supplementing rations for hogs in different parts of Maryland and a survey of the sheep industry, with a correlation of the factors which might influence its development in the different sections.

Dairy Husbandry

This branch of Animal Husbandry is one of the major agricultural industries in the State. The geographical position makes every part of the State accessible to good markets for milk and milk products at remunerative prices. Dairying will continue to grow, but it will be largely along the lines of producing market milk. Many investigations have been conducted to the benefit of the milk-producers and consumers, and those in progress should contribute helpful results for both classes.

The following projects are now under way:

Breeding for increased production and quality.

Feeding tests for increased economical production.

A study of factors influencing seasonal variations in the quality of milk.

A study of some factors influencing colors and flavor in milk.

Growth studies of dairy animals.

A study of the relation of water supply to milk flow.

A comparison of the Baltimore and composite methods of making the monthly milk tests.

Compiling statistics of the Cow Testing Associations and Bull Associations.

Poultry Husbandry

The poultrymen of Maryland have about four million dollars invested in stock, from which they sell annually about six million dollars of produce. The well managed and cared for flock yields a fair return for the time and food consumed. This industry, however, in common with all others, has its problems and difficulties which need investigation in order to place it on a satisfactory and efficient basis.

The investigations undertaken have been of two general types, one the testing of new theories, new appliances, new plans and new management schemes; the other is the working out of original plans, establishing the factors which influence success and failure and determining the underlying principles of the industry.

The following investigations have received the attention of this department this year:

A study of the use of meat and fish scrap in poultry rations.

A study of methods of pullet selections for egg production.

System of culling the flock.

Much time has been given to working over data of other experiments and the demands for help in the field and by correspondence has greatly increased.

ANIMAL DISEASES

Pathological and Biological Laboratories

Much work has been done in the Biological and Pathological Laboratories with miscellaneous diseases of domestic animals. There were examined during the year in the laboratory 748 specimens. In addition to this, the field work necessitated visiting 117 farms, traveling 4,100 miles and making observations on 10,000 animals, including poultry.

The major project under investigation was a continuation of the study of factors in conection with the control of hog cholera. It will require several years to complete this investigation.

A new investigation has been started on a study of the curative properties of Ozone and Ozonized oils. There has been a special laboratory equipped for this work.

The facilities for the Animal disease work has been greatly improved and enlarged through the purchase of 12 acres of land east of the B. & O. R. R. and near the College Park depot. This, with the buildings already on the place and some additions which have been made, gives this department a chance to expand its work in a convenient yet isolated location.

Anti-Hog Cholera Serum, Etc.

The demands for anti-hog cholera serum, hog cholera virus, syringes, thermometers, disinfectants, etc., sent out during the past two years have materially decreased. This is best shown by the quantities of these products called for by the hog-raisers during the past few years. In 1920-21 there was sent out 586,770 c. c. of anti-hog cholera serum. In 1921-22 requests were made for 476,075 c. c. In 1922-23 there were requested 262,800 c. c.

This marked decrease is, we believe, due to two factors. The first one is of comparatively slight importance to the hog cholera situation in the State, but in justice to the work should be mentioned. It is the fact that many of the farmers are at present purchasing their serum from other sources. Our totals, therefore, do not show the quantity of this product used within the State. The other factor, and the one of real importance, is the fact that Maryland is accomplishing better results in the control of hog cholera than any other State in the Union. Further, it may be stated, that at the present time Maryland is the only State which is operating on a definite plan for the control and ultimate eradication of hog cholera from the country.

Tuberculin

As usual, tuberculin for the diagnosis of tuberculosis, has been prepared at the laboratory during the past two years, and sent out to the veterinarians of the State free of charge.

The total amount requested and distributed for the year 1921-22 was 387,173 c. c. This total included both the subcutaneous and the intra-dermal products. This is an increase of 1,121 c. c. over the amount sent out during the previous year.

Legume Inoculum

During the year 1921-22 cultures for the land inoculation of legumes have been grown at the laboratory and supplied to the farmers throughout the State, through the County Agents, free of charge.

The demand for this material has increased enormously, but unfortunately we have not had funds to permit us to supply all of the demands. We were able, however, to furnish about 1,000 more cultures than were sent out the year before.

During the year 1922-23 it was deemed advisable to make a charge for the inoculum sufficient to cover the cost of materials, not including labor, and to supply as nearly as possible all the demands for this material, as the time of our laboratory staff would permit. The work, therefore, was carried out on this basis during the past year.

The table on the following page gives in detail the cultures sent out:

Cultures sent out at a charge of 25 cents per tube to the farmers of the State for inoculation of legumes during the year beginning October 1, 1922, and ending September 30, 1923.

Kinds of Seed To Be Inoculated	*Number of Tubes*	*Bushels of Seed Inoculated*
Alfalfa	1,883	3,766
Beans (Lima)	1	1
Beans (Soy)	7,261	7,261
Beans (String)	1	1
Beans (Velvet)	2	2
Clover (Alsike)	9	18
Clover (Crimson)	34	68
Clover (Hubam)	2	4
Clover (Japanese)	6	12
Clover (Lespedeza)	4	8
Clover (Mammoth)	1	2
Clover (Red)	79	158
Clover (Sweet)	322	644
Clover (White)	6	12
Peas (Black)	2	2
Peas (Cow)	258	258
Peas (Garden)	30	30
Peas (Sweet)	4	4
Sapling	9	18
Vetch	178	356
Totals	10,092	12,625

Horticultural Investigations

Maryland has much land suitable to the growing of fruits and market garden crops, and her geographical position offers exceptional markets for this class of products. This Station has aimed for many years to emphasize the phases of work which would

contribute to the extension of the area devoted to horticultural crops, believing that they would prove more profitable than the staple crops on many soils. Maryland's agriculture is destined to be more and more devoted to the growing of food for man. The investigations listed in the 35th Annual Report are in progress. Some of them are nearing completion and full reports of the results will be published during the coming year.

There are very many new projects demanding consideration, but they cannot be taken up, as suitable land is not available, and they would require more specialists, more labor and more funds for maintenance.

Department of Plant Physiology

This department of the Station is giving much attention to matters influencing the ripening, storage and conservation of fruits and vegetables and grains. The results already obtained have enabled many people to adopt better methods of storage with much satisfaction and profit. Many of the factors necessary to provide in storage houses can now be determined with a certainty and needs no longer to be a matter of guessing.

Many of the projects in connection with the growth of plants now under way in the Soil, Agronomy and Horticultural Departments are dependent upon chemical and physiological changes for their solution. Investigations are being continued on the projects listed in the 35th Report.

The immediate and practical aspects of the work in the Department of Plant Physiology and Biochemistry are concerned mainly with the great economic problems of food supply. The following groups of problems are now being especially emphasized:

1. The fundamental problems of plant growth and production.
2. The physiological aspects of plant diseases and immunity to disease.
3. The fundamental problems of hardiness in fruit buds and stems, a most important problem of the fruit industry of the State.
4. Conservation of plant food products during storage and transportation.
5. Physiological and chemical problems of importance to the canning industry of the State.

Fence Posts

Tests were inaugurated 35 years ago on a comparison of different woods and methods of treating fence posts to increase their durability. The scope of this piece of work was enlarged 12 years ago. The results obtained from this study are the most complete on record for this section of the country and should increase in value each year.

Department of Plant Pathology and Botany

The projects listed in former reports are being continued. The following is a summary of results obtained the past year:

Project I. A field study of injury from tomato Septoria showed the importance of rotations for the control of this disease and that other causes have this year produced much of the leaf spot usually attributed to this disease.

Project IV. Various points in the life history of the peach rot Sclerotinia have been determined; methods of distinguishing the strains of the fungus worked out; its relations to acidity determined, and on the basis of the latter a promising method of control by soil treatment developed. Two scientific papers have been published on this work, and the results of one phase of the investigation prepared for a Bulletin. The results obtained aid in the control of a disease that destroys annually 20 to 50 per cent. of the peach crop.

Project VI. Progress has been made on a Maryland grass Bulletin, but delayed for work on mosaic.

Project IX. Tests are being made of the possibility of mosaic and other diseases being carried in tomato seeds. The results agree with previous work in being negative so far.

Project X. Many specimens have been identified for farmers and for other members of our staff, thus saving much time and uncertainty about the value of, or damage done by, many plants, fruits, weeds, flowers, diseases, etc.

Project XI... Progress has been made in the study of Mycosphærella, but no new results to report.

Project XII. Field Control—Under this are included a number of distinct experiments carried on by Dr. Jehle, and to some extent by Prof. Temple. Dusting and spraying experiments carried on in co-operation with the Entomological Department have indicated practical control of cantaloupe diseases by the more economical dusting methods. Tests have been made of dust and spray methods for control of tomato and potato diseases, and for apple scab and blotch, and sulphur dusting for potato scab. The modern dusting methods have proved of considerable practical value in some of these cases, and further tests are thought to be of great importance.

Project XIII. Multiplication of the stock of seed of the disease resistant peas is being continued.

Project XIV. Corn-root rot control is being demonstrated in co-operation with the Agronomy Department, by selection of more disease-free ears by examination of the cob colors, has resulted in new methods that added an average of ten bushels per acre on a number of test plots; this increase, if continued, would be of immense value to Maryland agriculture, as the disease is very generally distributed.

Project XV. A recent survey of the damage to tomatoes from mosaic disease and how it is spread has shown a loss on early infected plants as high as 50 per cent., which in badly infected fields would give a total field loss of 20 per cent. The average loss for the thousands of acres examined in several counties would not be over 2 to 4 per cent. Practical methods of control are indicated in care in selection and management of beds and handling plants in transplanting and early cultivation. Insect and weed carriers, and especially infection by human agencies, have to be considered. The same methods

apply largely to tobacco mosaic, where the loss is often as high as 20 to 50 per cent. in leaf area alone on affected plants, and while some fields are almost free from it, some with high bed infection would have 10 per cent. or more loss.

Project XVI. Dahlia Disease and Varieties—A study of the stunt diseases of dahlias and other dahlia troubles has been made possible by the dahlia trial garden here. Results so far show means of recognizing the disease in early stages and that it can be eliminated by selection of healthy stock. This and other dahlia work done are of value to thousands of Maryland growers of this, one of the easiest of large flowers for everybody to grow, many of whom have considerable commercial interests in dahlias.

The Department of Entomology

Investigations on the projects listed in the last report are being continued. Every year either some new or old insect makes a severe attack on some crop and calls for an extra effort in supplying information as to methods for its control. These conditions bring to the front new problems and keep the entomologists constantly on the alert, and makes it necessary at times to quickly change from one problem to another. The application of the results of the measures determined for the protection of crops against insect ravages have saved many thousands of dollars and made it practicable to continue to grow many fruits and crops that otherwise it would have been unprofitable to attempt to produce.

During the past year the investigations in dusting peas and cantaloupes for the control of the Aphis has given marked results, and the use of the methods and dust devised has saved crops which have yielded the farmers many thousands of dollars.

The studies in connection with the control of the European red mite have developed a successful method for combating an insect which is capable of doing a large amount of damage. The work of this department in preventing the introduction of new and harmful insects is very valuable.

Seed Inspection

Since the passage of the law requiring a guarantee of quality for all farm seeds sold in the State there has been a decided improvement of all seed exposed for sale, and the grades of very low quality with high content of weeds have almost disappeared from our markets. Farmers are appreciating the service rendered by the Inspection Laboratory and send many samples in for test, both before and after buying.

The work of seed inspection has saved the farmers much by preventing the purchase of worthless seeds, but even now many who are not availing of this service are wasting much money and losing much by crop failures by purchasing inferior seed. Last

year the inspection showed that about 50 per cent. of the samples had a seeding value equal to the guarantee; 10 per cent. were better than claimed to be, and 40 per cent. were inferior to what they were represented.

There is need for much investigational work on methods for seed analysis. This cannot be carried out without more funds for help and facilities.

The seed inspection service hopes that means may be devised for giving the farmers more protection and information before he purchases his seed rather than tell him of its quality several months after it was used. The passage of a Federal seed law would prove of advantage to the reliable seed trade and give the farmers a much-needed protection on interstate shipments.

Ridgely Sub-Station

The Ridgely High School farm was transferred to the Experiment Station for use as a Sub-Station in 1915. The farm consists of about 50 acres of tillable land, representing mostly the Sassafras soil types. The silt phase of this type of soil is commonly called White Oak, and generally it is rather poorly drained and somewhat difficult to manage. This condition, which prevails on a part of this farm, is being gradually corrected by tile draining. The fall is small and the tile cannot be placed as deep as is desirable for best results. Almost the entire farm is devoted to experimental work. The principal tests in progress at Ridgely are:

1. The use of fertilizers in a rotation of corn, wheat, hay and tomatoes.
2. The effect of lime with and without fertilizers and manure.
3. Tests of varieties of tomatoes and early plants on total yield.
4. Tests with late potatoes—varieties, size of seed, and fertility.
5. Experiments with garden peas for canning and market.
6. Experiments with sweet potatoes, eggplants, peppers and cantaloupes.
7. Variety tests of corn, wheat and soy beans.
8. Tests of new selections of wheat.
9. Growing multiplication plot of Mammoth Red Wheat for distribution.
10. Variety and fertilizer tests of strawberries.
11. Tests of different kinds of lime on alfalfa.

Requirements

The demands for research work and investigations to solve the many problems which the farmer meets is constantly increasing. This means that this institution must have greater facilities and more for maintenance if it is to render the real service which is expected.

The encroachments made by the construction of new buildings and enlarging the campus has reduced the amount of land available for cultivation on the Station farm to less than 100 acres. Much of this remaining land has been used in so many ways and for such a variety of tests that it is no longer suitable for investigations. The need of more land is very pressing.

The Station should have some farms near the University for animal and dairy husbandry and some phases of its soil and crop studies, and it should also have some farms in the fruit and market garden areas for certain lines of investigations on these subjects. These farms should be purchased or rented for a term of years.

The policy of conducting work in different parts of the State so as to meet local soil, climate and other conditions has proved satisfactory, but it necessitates an increase in amount for traveling expenses. This class of work should be extended, as it is serving a good purpose and proving satisfactory to both investigators and farmers.

The providing of the new buildings as outlined in the University program will add many of the facilities needed by some of the departments, but these should be supplemented by green houses, laboratories and barns, specially designed and constructed for investigational work and where the work and workers will not be bothered or hampered by classrooms for commercial problems.

Agricultural research must be considered as an investment, and enough has been presented to show that the returns pay a large dividend. Maryland's greatest natural and undeveloped resource is in her agriculture, and consequently much of her future greatness will depend upon its development through research, education and demonstration.

Finances

The following financial statement gives the details as to the receipts and expenditures of the appropriations received during this fiscal year.

The greatest efficiency of the investigator and his work demands more latitude and quicker means for obtaining supplies than is afforded by the present system of making purchases. The delays in procuring supplies has in some instances proved serious, and the amount of detail necessary in all cases is dwarfing upon the energies and initiative of investigators. The investigator is dealing constantly in the unknown, and this makes it often impossible to foresee the needs of the work even a few hours in advance, to say nothing of three to six months.

The State purchasing system has proved expensive in clerk hire, time, energy and delays, and has not saved the Experiment Station money or rendered its work any service in any way whatever.

The making of the maintenance appropriation in one lump sum for 1923 and 1924 has proved of benefit in greater efficiency and economy, and also been of advantage in other ways.

The policy of making lump-sum appropriations for a group of expenditures and permitting the Boards of Control and Executives to distribute it as to details is very desirable and should be continued.

The appropriations for salaries and maintenance must be increased if capable men are to be held and procured and the Station is to give the farmers the help in solving their problems, which they expect.

The Station should also have special appropriations for land, buildings and other facilities necessary for its work. These appropriations are an investment which will yield returns many times the cost.

FINANCIAL STATEMENT

Maryland Agricultural Experiment Station in Account with United States Appropriations

	Hatch Fund	*Adams Fund*
Dr.		
To appropriations for fiscal year 1922-1923	$15,000.00	$15,000.00
Cr.		
By Salaries	$14,152.62	$13,261.72
Labor	68.12	12.09
Publications	None	....
Postage and Stationery	8.91	27.00
Freight and Express	161.70	....
Heat, Light, Water and Power	....	196.17
Chemicals and Laboratory Supplies	327.02	406.93
Seeds, Plants and Sundry Supplies	22.67	42.59
Library	....	5.40
Tools, Machinery and Appliances	1.43	161.81
Furniture and Fixtures	21.80	5.90
Scientific Apparatus and Specimens	232.55	740.07
Contingent Expenses	....	....
Traveling Expenses	3.18	120.25
Buildings and Land	....	20.07
Totals	$15,000.00	$15,000.00

MARYLAND AGRICULTURAL EXPERIMENT STATION IN ACCOUNT WITH THE STATE APPROPRIATIONS

DR.	*General Fund*	*Ridgely Farm*
Balance June 30, 1922	.....	$1,177.36
Receipts for year 1922-1923	$55,804.44	5,765.88
Totals	$55,804.44	$6,943.24
CR.		
By Salaries	$23,423.14	$2,516.27
Labor	11,920.68	1,675.24
Publications	1,539.07	....
Postage and Stationery	644.33	104.10
Freight and Express	960.87	99.41
Heat, Light, Water and Power	1,577.47	7.20
Chemicals and Laboratory Supplies	655.41	119.34
Seeds, Plants and Sundry Supplies	1,393.86	786.09
Fertilizers	1,229.89	160.00
Feeding Stuffs	3,839.55	....
Library	351.29	....
Tools, Machinery and Appliances	1,411.04	287.83
Furniture and Fixtures	761.50	29.00
Scientific Apparatus and Specimens	652.36	176.12
Live Stock	200.00	....
Traveling Expenses	1,410.77	545.26
Contingent Expenses	1,842.73	44.46
Buildings and Land	1,990.48	348.15
Balance	....	44.77
Totals	$55,804.44	$6,943.24

Maryand Agricultural Experiment Station—Farm Account

Dr.

Receipts from sales for year 1922-1923	$13,221.45

Cr.

By Salaries	None
Labor	$8,100.49
Publications	10.00
Freight and Express	103.88
Heat, Light, Water and Power	121.24
Chemicals and Laboratory Supplies	13.67
Seeds, Plants and Sundry Supplies	135.14
Feeding Stuffs	903.10
Tools, Machinery and Appliances	7.52
Traveling Expenses	295.53
Contingent Expenses	154.00
	$9,844.57
Overdraft June 30, 1922	8,366.53
	$18,211.10
Overdraft June 30, 1923	4,989.65